Challenges of Using EMI in Teaching and Learning of University Scientific Disciplines: Student Voice

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Abstract: The main objective of the study is to identify students' perceptions regarding lecture comprehension, communication, pedagogy, assessment, and affect in an English Medium Instruction (EMI) setting. The participants in this study are 264 Saudi students studying Computer Science, Engineering, and Medicine at King Khalid University. A questionnaire with a four-point Likert scale was used to survey the participants' views on the challenges they encounter as a result of the use of EMI for teaching and learning scientific disciplines. The collected data were analysed quantitatively with SPSS and qualitatively by using the content analysis method. The major findings of the study indicate that using English language to teach scientific disciplines has a seriously negative impact on the scientific content comprehension and assessment of a majority of the students in the present study. The study recommends ensuring quality English education in the foundation year and examining the option of "additive bilingual education".

Keywords*: English Medium Instruction, Arabic Medium Instruction, Lecture Comprehension, Language Education Policy, Higher Education, Language Barrier

1. Introduction

In most Arab education institutions, the shift from a school education that provides Arabic medium instruction (henceforth, AMI) to tertiary education, which provides English medium instruction (henceforth, EMI) for students with scientific majors is a big challenge, especially in the absence of an efficient English preparatory program. Shamim, Abdelhalim and Hamid (2016) call for providing research-based support to facilitate the shift in the medium of instruction from Arabic in high school to English in higher education settings. This educational shift in the medium of instruction, though sometimes institutionally justified, conveys several challenges to students, teachers and institutions which are related to instruction delivery, assessment, communication and the quality of learning outcomes. To illustrate, Al Abdul-Rahman (2010) argues "indeed, the reality of teaching medicine in Arab countries in foreign languages is evidence of psychological defeat, especially if we admit that the graduates do not often have the ability to write one page in English without making many mistakes. Moreover, they avoid involvement in academic discussions due to their low proficiency in the foreign language. The reason is that students' English proficiency is low, and what they learn is a hybrid of both Arabic and English. In addition, their academic reading is slow which results in relying on summaries and notes rather than reading textbooks".

Given this significant shift, this study was designed to examine students' attitudes towards this change in the medium of instruction and how they adapt to it and to examine what impact this shift may have on the quality of teaching and learning. Before delving into the details of this study, it is necessary to begin discussing this issue in a conceptual framework that helps identify the problem and its roots.

2. Conceptual Framework

Research has provided solid evidence that mother tongue education leads to better academic performance. It has demonstrated the close relationship between teaching in the mother tongue and good academic achievement (Markee, 2002; William & Cooke 2002). Similar findings have been observed in several UNESCO studies and literature (1953, 2008). However, the global spread of English has brought about a new higher education scenario in which mother tongues in many non-Anglophone countries worldwide have taken a backseat to English, leading to a flourishing area of research called EMI. According to Madhavan (2016) EMI is "teaching subjects using the English language without explicit language learning aims and usually in a country where English is not spoken by a majority of the people." Scholars, researchers, and policy makers present several arguments to support this move. The first is the role that English now plays within the geopolitical framework worldwide. It has become almost the sole contact language for trade, commerce, diplomacy, and scholarship (Kirkpatrick 2010). The second argument is the growth of higher education in the world in general and in Asia in particular where obviously, "you can see the hunger for learning" (Pie News, 2015). Students from Asia represent over half of the world's mobile international students (IEAA, 2015). A third argument stems from the policy actions of governments in several Asian countries in relation to internationalization. EMI has become the most important feature of macrolevel language policy and planning over the past twenty-five years, both regionally (i.e., policies formed Asia-wide), locally (i.e., policies formulated by ministries of education), and institutionally (i.e., policies approved by individual universities). Dearden (2014) notes these arguments aim to develop foreign language skills, enabling students to work in a foreign language environment and become bilingual and multilingual, enhancing their education to respond to globalization, preparing students for postgraduate studies, and attracting foreign students to local universities.

The present study is informed by a critical theoretical approach and draws critical applied linguistics (CAL) to inform the interpretation of the data. One of the central aims of CAL is to problematize given truths, by revisiting their relevance and efficacy (Pennycook, 2001). This theoretical approach explores aspects of our educational reality that have been taken for granted and are identified as "naturalized" assumptions to be questioned (Pennycook, 2001). It follows that CAL can highlight the problematization of a given reality, along with the unchallenged assumptions which shape language policy. Spolsky (2004) argues that all the language practices, beliefs, and management decisions of a community or polity are driving forces for language choice. CAL, however, calls for scrutiny of decisions made at the administrative levels, which subsequently influence the educational process, including pedagogical decisions made in the classroom and quality of learning.

3. Aims and Significance of the Study

The main objective of this study is to identify some of the challenges faced by students in tertiary Saudi Arabian education due to the use of a foreign language as the medium of education and the need to seriously think in support of a new language policy and planning that ensures the preservation of the status of Arabic language and its role in higher education and the utilization of English as a window through which global scientific production can be accessed.

This study is important in that it tries to identify the impact of the use of English as a language of education in scientific disciplines on the educational situation inside and outside lecture halls, and then it emphasizes the need to adopt a language policy plan that preserves the educational function of Arabic and provides an environment of additional rather than subtractive bilingualism (Luckett, 1993).

4. Literature Review

Many studies have examined the impact of EMI on university education in non-English speaking countries. Phillipson (2015) argues that such a situation is an example of linguistic dominance. He called for the linguistic dualism that generates not an English-only policy that affects mother tongue, but rather maintains cultural heritage and linguistic diversity. Mahboob (2017) discussed the "imposition" of English language in Pakistani higher education and the effect it has on creating class discrimination among students in a single society. In Vietnam, Manh's study (2012) addressed some of the factors that could cause the long-term failure of education as a result of the application of a foreign monolingual policy in university education programs. In the same context, Vu and Burns (2014) studied the challenges affecting higher education as a result of using the English language as a medium of instruction. These problems include the weakness of the teaching staff's English, language proficiency of the students, learning methods, teaching methods and the availability of appropriate resources. Basibek et al. (2014) share the same concern in their study on engineering departments of Turkish public universities.

In a study linked to EMI challenges, Wiseman and Odell (2014) believe that lecturers in such an educational environment believe that their role is not to help students understand English, which is the language of scientific content, but to provide content in English whether the student understands it or not. Knagg (2013), in his study from the perspective of the British Council, argues that this type of teaching requires highly educated students and strong English preparation. He also states that this type of education is either detrimental or helpful. It could harm due to the lack of coverage of the curriculum in depth which is caused by the language barrier; this view is shared by Kirkgoz (2005) and Darden (2014). According to Marsh (2006), the use of English as a language of instruction in schools in some poor countries is directly linked to educational failure and deprivation. Macaro (2015) addresses the situation inside the classroom and tries to discover whether the educational process becomes less interactive between parties due to the use of a foreign language as a teaching language. He concludes that contemporary scientific research supports this finding; Airey and Linder (2006) reach the same conclusion. Similarly, Sert (2008) and Tamtam et al. (2012) show the ineffectiveness of using English to present scientific content as well as its negative impact on students' critical thinking abilities.

Williams (2015) in South Korea argues that the challenges to the learning process of using English as a language of instruction are greater than opportunities for all parties, and this may be a natural consequence of implementing an accelerated language policy without paying attention to the necessary academic support. Kim (2011) believes that the purpose of this type of education is to upgrade the global and local ranking of institutions rather than the needs of students.

The situation in the Arab world is not different from the abovementioned environments. Several studies have addressed similar challenges in the United Arab Emirates and Saudi Arabia. Troudi and Hafiza (2017) study the dilemma of the English language and its role in the United Arab Emirates and the Gulf states and argue that the link between the use of English as a language of instruction and the decline of Arabic as a language of scientific and academic affairs is absent in the academic discourse in the region. The study also shows the double burden on students when they are forced to study in a language other than their own and to internalize the scientific content. Bowman (2011) wonders whether EMI in UAE serves local or global needs. In a survey study by Troudi and Jendli (2011), the students' opinions on the employment of EMI are investigated, and the study finds that they link the issue of Arabic to the discourse of identity as well as cultural and linguistic heritage. The study also criticizes the discourse that deepens the imposition of the reality that English is the only language of science and academia and restricts the Arabic language in the expression of cultural and religious heritage only. The study confirms the possibility of coexistence between the two languages in the academic environment. In the Qatari context, Pessoa and RajKumar (2011) demonstrate that although the prevalence of English is in line with the state's rapid modernization, there is fear and anxiety about the loss of the Arabic language in academic and professional roles.

As far as the Saudi context is concerned, several studies exist that address EMI in higher education. For instance, Shamim et al. (2016) discusses English language in the preparatory year at Taibah University and the challenges that faculty members and students face, such as students' weakness in the English language, and how to address these challenges and their impact on scientific content learning. Ebad (2014) highlights the knowledge gap between teaching and learning and between teachers and students as a result of the use of EMI in higher education and modest Arabization efforts. Alhamami (2015) addresses the teaching of scientific courses in Arabic from the perspective of specialists who teach these courses at the university. The study results show that most of teachers prefer to teach specialized scientific courses in the mother tongue because the English language represents an academic and social challenge for students in the bachelor's degree program. In a similar survey study on students at Jazan University, Hassan and Abdul Aziz (2012) find that most pharmacy students preferred Arabic as a language of instruction. The study also emphasizes the difficulty of discovering the linguistic challenges students face in understanding scientific concepts and the scientific language of the book. Onsman (2012) points to the problem of the internationalization of English in academia, in the GCC countries in general and in Saudi Arabia in particular, that results in the marginalization of the role of Arabic as a language and a culture. Al Kahtany et al. (2016) believes that it is currently difficult to remove English from its role as a medium of instruction in Saudi universities without enriching the linguistic potential of the Arabic language to be able to assume this role. The study points to the need for the Arabization of higher education.

Previous studies that address the impact of using English instead of the mother tongue in higher education institutions in different countries of the world and in the Gulf and Saudi Arabia in particular have been reviewed. Various studies on the need for the Arabization of Saudi higher education have also been surveyed. The findings of all these studies seem to unanimously call for an urgent need to determine the views of students who are experiencing EMI. This study was conducted among the students of the scientific faculties at King Khalid University, a large university in Abha, South of Saudi Arabia, which ranks fourth among Saudi universities. The contribution of this study lies in its attempt to determine exactly what happens in an EMI lecture, with a special focus on lecture comprehension, performance during exams, in-class communication, study from textbooks and notes, and affective impact this experience has on students.

5. Research Questions

This study attempts to answer this question: "How do King Khalid University students of scientific faculties assess their experience of using English in teaching, learning, communication and testing?" This major research question was divided into the following sub-questions:

1. To what extent does a lecture presented in English pose a challenge to content comprehension?

2. What is the impact of EMI on students' performance in assessment tasks?

3. Is communication between students and faculty members in the lecture hall and during office hours hindered because of English?

4. How do students face the challenge of English books and references during their study and exams?

5. What impact does this mode of instruction have on students?

6. Is there any variation in students' responses due to the impact of the variables of English proficiency level, major, gender, or level of study?

Responding to these research questions is likely to identify some of the challenges facing university education in Saudi Arabia because of EMI and to highlight the need to seriously consider language policies and planning that contribute to maintaining the status of the Arabic language and its role in providing quality education and the use of English to facilitate access to global scientific production.

6. Methodology

Quantitative and qualitative research methodology was used in data collection and analysis. The quantitative analysis was based on IBM SPSS Statistics 21 descriptive and inferential statistics. The qualitative analysis was based on thematic analysis of the responses to the open question in which respondents were asked to reflect on their experience with EMI.

6.1 Participants

The study sample consisted of (264) students from different study levels; 143 (54%) of them were females and 121 (46%) were males. They were enrolled in the Faculties of Medicine, Engineering and

Computer Sciences at King Khalid University during the data collection period. The distribution of participants across disciplines is as follows: 148 (56%) students come from Computer Science, 68 (26%) students come from the medical college, and 48 (18%) students belong to the Engineering College. The participants were asked to self-rate their level of English proficiency, and the results were as follows: 26% thought they were weak, 43% thought they were good, 64% thought they were very good, and 18% rated their English proficiency as excellent. Although self-assessment of English language proficiency is not perfectly accurate, it may provide a rough idea about the general proficiency level.

6.2 Data Collection

With the help of Google Forms, an online survey was created and posted on the university learning management system (Blackboard) after obtaining official permission from the e-learning deanship. Frequent access of Blackboard by all students in the university is a requirement. The survey link stayed on the website for a month. Three hundred and forty one students accessed the survey and answered the questions. Seventy-seven students were excluded because they did not complete the entire questionnaire, and some of students belonged to faculties other than medicine, engineering, and computer science.

The survey consisted of three sections. The first section elicited descriptive information from the sample to identify participants' gender, scientific specialization, grade point average and year of study. The second section consists of 33 statements that were meant to answer the five research questions. The last section was an open question that required the respondents to provide any comments they have related to their EMI experience. Participants' responses were elicited by using a four-point Likert scale where the respondents choose one of these four responses: strongly agree, agree, disagree, and strongly disagree.

6.3 Statistical Analysis

The Likert scale was used to evaluate students' responses to the statements. The means were characterized as follows: the range from 1 to 1.75 indicates respondents' strong disagreement; 1.76 to 2.5 indicates their disagreement; 2.6 to 3.25 means respondents agree; 3.26 to 4 is an indicator of students' strong agreement with the statements. In other words, the cut-off point between agreement and disagreement is 2.5. One-way ANOVA was used to determine if there were statistically significant differences between the means of variables. To measure the reliability of the data collection tool, a Guttman scale was used, and the coefficient was 0.734, which is an acceptable value for tool reliability. To measure tool validity, inter-rater method was used and the results showed homogeneity of the ratings done by judges who were experts in Applied Linguistics from two Saudi universities. The suggestions made by them were used to enhance comprehensibility and distribution of statements across different themes. Exploratory Factor Analysis was used to test the reduction of data to the five sets of variables represented in the first five research questions. To achieve this goal, the data underwent Kaiser-Mayer-Olkin test that measures how suited the data is for Factor Analysis, and the result was greater than 0.791, indicating the adequacy of the grouping of survey items (Hair, Anderson et al. 1995a; Tabachnick and Fidell 2001). Moreover, Bartlett's test of sphericity is statistically significant with the value of 0.000.

Table 1: Explanatory factor Analysis

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.791
Bartlett's Test of Sphericity	Approx. Chi-Square	234.020
	Df	10
	Sig.	.000

7. Results

The researcher used quantitative and qualitative research methodologies in data collection and analysis. For the purpose of quantitative analysis of the survey, the researcher used an SPSS program for both descriptive and inferential analysis. The qualitative analysis was based on the open question in which respondents were asked to reflect on their experience with EMI in the university. This section presents the statistical results and discussion of the six research questions as follows.

7.1 EMI and Content Comprehension

Three statements were used to answer the first research question from the students' perspective. The statements and results are shown in the table below:

Table 2: EMI effect on scientific content comprehension

Statements	SA	A	DA	SDA	Mean	Mean%	SD
Using English medium instruction is the main reason behind the difficulty of scientific content comprehension.	54%	23%	18%	5%	3.33	83.25%	.897
Difficulty in comprehending scientific content is mainly caused by the fact that text books are in English.	58%	21%	13.5%	6.5%	3.39	84.75%	.879
My linguistic proficiency is adequate for comprehending scientific content in books and lectures.	9%	26%	37%	28%	2.13	53.25%	.950

As Table 1 shows, there is a problem with lecture and textbook comprehension faced by students with science majors at King Khalid University. The main reason is that the language of lecture, books, and notes is essentially English. Paradoxically, the students are not well-equipped linguistically to attend

English science lectures and read English science books. The table shows that 83% of the students agree with the statement that the study in English is a major reason for the difficulty in understanding the scientific content. The table shows the mean of this statement is 3.33 which means that a large proportion of the participants in this study strongly agree on the difficulty of studying due to the use of the English language.

It is notable that the statistical analysis of the second statement is largely consistent with the first statement because of the similarity of meaning despite the fact that their positions in the survey are dispersed, which strengthens the validity of the tool and the validity of the analysis. The statement here focused on the impact of English textbooks and notes in English on understanding scientific material during study; 79% of the study sample (mean of 3.39) agree this is a real challenge. This indicates, once again, that a majority of the participating students strongly agree with the difficulty of understanding the scientific content of the English books and notes. This difficult educational atmosphere imposed on students and their inability to function properly in it is confirmed by their responses to the third question under the first theme that inquires about the English language proficiency of the students. The table shows that 65% of the students believe their English language does not qualify them to understand the scientific material presented in the lectures and the books, while only 35% see that their English language proficiency qualifies them to understand EMI. This is confirmed by the mean of "2.13", indicating that majority of students do not consider their English language proficiency as sufficient to help them understand the lectures and scientific content. This finding supports what Troudi (2009) argues by claiming that studying through another language adds to the learner's cognitive burden and makes mastery of content subjects more difficult and contingent upon the student's language skills.

7.2 Impact of Using English on Students' Performance in Assessment Tasks

This study theme deals with the participants' evaluation of their performance in the tests. In Table 2 below, it is noticed that 72% of the students with a mean of 3.18 believe that the main reason for their failure on tests and their low scores is that the tests are in English; 87% of them with a high mean score (3.55) believe that if they had the opportunity to take their tests in the Arabic language, their performance would be much better. The results shown in the third statement under this second research question confirms a significant reason for students' failure is resulting from the language barrier, which prevents their ability to arrange ideas logically while answering the test questions in writing. This challenge is shared by 62.5% of the participants in the study as shown in the table below. According to Marsh (2006) "failure to achieve satisfactory educational outcomes when teaching through English is commonplace in certain countries. This failure is compounded by stakeholders seeing barriers to learning in terms of language, as opposed to learning needs, cognition and methodologies."

Table 3: Impact of EMI on students' performance in different assessment tasks

Statements	SA	A	DA	SDA	Mean	Mean%	SD
I usually do not do well in exams because questions are in English which hinders my comprehension of questions and production of answers.	49.7%	22.3%	18.8%	9.2%	3.18	79.5%	1.01
If given the chance to take exams in Arabic, I would do pretty well.	66.3%	21.1%	9.3%	3.3%	3.55	88.75%	.782
I can present my ideas well and logically when I do my exams in English.	10%	27.5%	35%	27.5%	2.15	53.75%	.959

7.3 EMI as a Barrier to Effective Communication between Students and Faculty Members during Lectures and Office Hours

The third research question deals with a crucial issue at the heart of the instruction process, namely, communication. It contains eleven statements that cover various aspects of student-teacher communication. It explores how communication is poor in such an EMI context as demonstrated in the following table:

Table 4: EMI effect on student-instructor communication inside and outside of class

Statements	SA	A	DA	SDA	Mean	Mean%	SD
Using English as a medium of instruction and communication in my department is a barrier to communication between students and their professors during office hours.	44%	29.3%	20.1%	6.6%	3.19	79.75%	.894
I hesitate to visit my professors at their offices for scientific inquiries during office hours because of the English language barrier.	39.5%	29.9%	21.9%	8.7%	3.08	77%	.958
I can organize my thoughts and ideas coherently when discussions are in English in the lecture hall.	11.2%	12.4%	43.4%	33%	2.35	58.7%	.840
My weakness in English is the main reason for not asking questions for clarification during the lecture.	50.9%	23.5%	17.6%	8%	3.20	80%	.954
I take notes in English during the lecture.	7.9%	32.6%	31.1%	28.4%	2.15	53.75%	.963

I take notes during the lecture.	28.4%	53.1%	14.3%	4.2%	3.00	75%	.798
My role in the lecture presented in English is a passive listener and I do not participate.	37.2%	38.1%	17.9%	6.8%	3.09	77.25%	.878
Instructors organize pair discussion and group discussion activities among students during the lecture that can help in enhancing content comprehension.	15.6%	8.1%	39.5%	36.8%	1.93	48.25%	.936
I can say that I am active during the lectures presented in English.	23.1%	5.4%	39.3%	32.1%	1.98	49.5%	.881
Because of my weakness in English, I hesitate to ask the lecturer a question to clarify a point I did not understand.	45%	27.2%	19.9%	7.9%	3.14	78.5%	.924

The statistical table above clearly diagnoses the challenges and accurately describes the reality of communication problems university students face inside and outside an EMI classroom. The overall trend of the responses, as demonstrated in terms of means and percentages, shows that the English language is a barrier to communication between students and their teachers both inside and outside of lecture rooms. During lectures, statistics shows that only 40.5% of the participating students take notes in English, and most of them cannot organize their ideas and thoughts coherently during any discussion in English (76.4%). The majority of them (72.2%) hesitate to ask questions because of the English language barrier. Only 23.7% of the students agree that teachers organize collaborative learning activities during lectures. The outcome of this poor communication is passive and inactive students (71.4%) whose role is mere passive listening (75%). Similarly, outside the lecture hall, almost all (70%) of them are reluctant and embarrassed to visit their teachers during office hours because of the language barrier. The same note is made by Macro (2015) and Ryhan (2014) in their studies on the role and impact of EMI in higher education from both students' and instructors' perspectives.

7.4 Strategies of Coping with the Challenges of English Textbooks and References during Students' Study and Exams

This research theme answers the fourth research question and attempts to identify the strategies used by students in scientific disciplines to cope with the challenge of English, which is the language of textbooks, references, readings, notes, assignments, activities, and exams. The following table presents the results of participants' responses to two statements aimed to confirm or reject a common belief within the study context that students depend mainly on translations and summarized notes.

Table 5: Impact of EMI on material content and study habits

Statement	SA	A	DA	SDA	Mean	Mean%	SD
I depend on note summaries and translated notes more than on the textbook because of my low proficiency in English.	48.5%	25.9%	19.3%	6.3%	3.19	79.75 %	.948
I spend most of my study time at home doing the translation from English into Arabic.	54.9%	26.9%	13.1%	5.1%	3.39	84.75 %	.827

As the table shows, 74.4% of the participants in this study (mean=3.19) rely on summarized and translated notes rather than on the textbooks, due to the English language barrier. In addition to that, the amount of time spent by students in translating lectures from English to Arabic is too much, as the statistics in the table show that nearly 82% of them (mean=3.39) spend most of the time doing translation work.

7.5 Impact of EMI on Students' Attitude towards Learning

It is clear from the table on attitudes towards the use of EMI in the teaching of scientific disciplines that this type of education is not welcome among university students in this study. The evidence is that 89% (mean=3.57) of the students participating in the study believe that the transition from AMI in schools to EMI at university seems to cause psychological problems among students, such as anxiety, frustration, tension and fear. In the next statement, 65% of respondents feel that the study of their major in English inevitably leads to weak educational outcomes, i.e., graduates who are academically weak in their specialization. These attitudes of the students in the classroom in specific educational situations are confirmed by the third, fourth, fifth and sixth statements in the table below. Responses show that 64% of the participants feel embarrassed in front of their classmates if asked to answer a question during the lecture in English, 75% of them do not enjoy written assignments in English, 68% do not enjoy discussions in English during the lecture. In contrast, 79% of the participants do not hesitate to answer questions in Arabic in the lecture. These results are summarized in the following table.

Table 6: The affective impact of EMI on students' attitude towards learning

Statement	SA	A	DA	SDA	Mean	Mean%	SD
The shift of medium of instruction from Arabic at school to English at university causes feeling of anxiety, frustration, tension, and fear.	%64.3	%25	%6.5	%4.2	3.57	%89.25	.752
I believe EMI results in weak learning outcomes.	%35.2	%30.1	%25.1	%9.6	2.96	%74	.982
I feel embarrassed in class if asked to answer a question in English.	%35.4	%28.5	%23.1	%12.9	2.95	%73.75	1.027
I feel comfortable when I am asked to do written assignments in English.	4.3%	20.8%	38.8%	36.1%	1.91	47.75%	.827
I enjoy participation in discussion when it is in English.	8.3%	23.4%	35.6%	32.6%	2.02	50.5%	.941
I feel embarrassed in class if asked to answer a question in Arabic.	8.7%	12.5%	35.2%	43.6%	1.82	45.5%	.911

7.6 Variation in Students' Responses due to the Impact of the Variables of English Proficiency, Subject, Gender, or Level of Study

This section will discuss the analysis of variance in participants' responses to the five research questions and whether their responses are affected by their proficiency in English, their majors, their study level, and their gender.

7.6.1 The Variable of English Proficiency

The analysis of variance shown in the table indicates that there is statistically significant variation between respondents with regard to the five themes of the research questions, and the significance of this variance is high with a "P" value of 0.00. This variation is attributed to students' low proficiency in English.

Table 7: Analysis of variance across different research-dependent variables attributed to the independent variable of participants' proficiency in English

		Sum of Squares	df	Mean Square	F	Sig.
EMI impact on content comprehension by students	Between Groups	2.081	3	.694	6.593	.000
	Within Groups	25.992	247	.105		
EMI impact on students' assessment and testing	Between Groups	7.705	3	2.568	14.242	.000
	Within Groups	45.265	251	.180		
EMI impact on students' psyche	Between Groups	1.288	3	.429	5.544	.001
	Within Groups	18.813	243	.077		
EMI impact on communication between students and instructors	Between Groups	3.482	3	1.161	16.490	.000
	Within Groups	17.034	242	.070		
EMI impact on students' study habits	Between Groups	53.104	3	17.701	45.835	.000
	Within Groups	98.094	254	.386		

7.6.2 The Variables of Study Major, Gender, and Study Levels

The analysis showed no significant difference between participants' responses which can be attributed to their major. This finding indicates that students in different subjects face the same challenges with EMI. For the gender variable, it was similarly found that there is no significant difference between students attributed to gender which means that both male and female students face the same difficulties as a result of English medium instruction in science majors. The statistics also show that the students' attitude towards employing English as the medium of instruction at university and its academic and affective impact is the same regardless of their study levels. In other words, all students in different levels consider English to be a challenge that poses a threat to their comprehension, performance in assessments, communication, and proper study habits.

7.7 Results of the Open-Ended Question

The survey that was administered to the King Khalid University students contained one open-ended question with the purposes of giving them a chance to write whatever comment they have about their experience with EMI. Out of the 264 respondents, 95 of them wrote comments.

Their comments support what has been discussed in the quantitative analysis, which supports the validity of the current research. Many respondents wish they are taught in Arabic, and they connected being taught in their mother tongue with better comprehension and better learning outcomes. The other important issue raised by some students was the problem of intelligibility of some instructors who belong to certain nationalities and have a heavy mother tongue accent that can cause comprehension problems when they use English for teaching. In addition, there are instructors who can be excellent in their discipline, but their English does not help them convey the knowledge they have intelligibly. Pedagogical skills of some instructors are poor, which results in poor class management and overdependence on lecturing. The inadequacy of the English foundation year (Williams, 2015) is one of the concerns of the participants in this study. They complain about the inadequacy of the English education they receive in the preparatory year. The quality of English education they are subjected to in schools was also considered by the participants as a major concern with consequences experienced in their tertiary education. As a result of all these challenges, students take recourse to rote learning. Kirkpatrick (2017) summarizes the consequences of EMI by saying that "Teaching remains teacher-centered and, students 'learn' by rote without developing any understanding of what they are memorizing." Many comments made by the participants call for dual language education where both English and Arabic play the role of media of instruction in a complementary manner.

8. Discussion and Conclusion

The present study attempted to answer six research questions through the statistical analysis of participants' answers. The major findings are discussed below.

1. Using the English language to teach scientific disciplines has a seriously negative impact on 78% of the students in the present study. The English language, which they learn through an intensive program, does not qualify them to act effectively in an environment in which English is the medium of teaching scientific content.
2. Over 70% of the participants in the study attribute the main reason for their failure in assessment tasks to the fact that the language of testing is English and, therefore, they cannot do well. The form and content of their performance are not satisfactory. Indeed, 87% of them believe that if they were tested in the Arabic medium, they would do better.
3. The impact of using the English language as the medium of instruction and assessment is not limited to affecting the comprehension of scientific content and performance in the tests but also to the psychological impact EMI incurs on the vast majority of students (See table 5 above), such as anxiety, frustration, tension, fear and embarrassment and, ultimately, poor educational outcomes.
4. It is known that the success of the educational process is essentially based on successful communication, interaction, and discussion, and, according to modern learning theories, the learner is the focus of the educational process. Despite all this, we find that the use of EMI in scientific disciplines without adequate preparation makes it difficult to yield fruitful results. Such a

situation goes against the fundamental principles of optimal educational environment and deprives the students of their basic rights in understanding, communication, interaction, discussion and inquiry. These rights are consequently evicted because of students' weakness in the English language. The quality of program outputs in this unhealthy environment (See table 3) is poor, and this concern has been frequently voiced by the Saudi Shura council on more than one occasion (Albulwi, 2016). In addition, this educational mode takes us decades back to the educational environment in which the teacher dominated the educational situation. A limited number of students who are fluent in English language may participate in this type of domination. More than two-thirds of the students in this study (Table 3) are denied their right to effective presence in the educational environment due to their weak proficiency in English.

5. This problematic educational environment is aggravated when we find that students learn very little about science because of their reliance on translated notes and superficial summarized contents. Indeed, this generation's time is wasted on translation, which is often inaccurate. How do you expect those who are weak in English to produce accurate translations of terms and content which may sometimes be a challenge to professional translators? Had the students received the scientific material in their native language, it would have been easier for them to grasp the meanings and to better utilize their time.

To conclude, the results of this study are consistent with previous studies in the literature on EMI in different settings in terms of challenges and problems incurred by this university instruction mode, including limited participation and comprehension on the part of students, surface learning, rote learning of content, low achievement in exams and limited acquisition and mastery of disciplinary knowledge (Arkin, 2013). Moreover, the challenge in the Arab context is perhaps stronger because of the low English proficiency in most Arab countries. According to the EF English Proficiency Index in its 8th edition in 2018, the Kingdom of Saudi Arabia ranks 83 among 88 surveyed countries which is characterized as a "very low" category. This ranking entails that persisting with university education in an English-only medium is a real threat to the quality of education in Saudi Arabia and similar countries. Therefore, bilingual education remains an option that can effectively contribute to address the EMI dilemma.

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